

1. A bonded structure, comprising:

an integrated circuit element having input/output pads;

a substrate having input/output pads; and

a plurality of physical and electrical connections

between said integrated circuit element input/output pads and said substrate input/output pads wherein each said connection includes a composite bump comprised of a polymer body and a conductive metal coating covering said polymer body, and wherein said composite bump is deformed when said connection is formed.

2. The bonded structure of claim 1 wherein said polymer is polyamic acid polyimide.

3. The bonded structure of claim 1 wherein said conductive metal coating is comprised of an adhesion layer, a barrier layer and a conductor layer.

4. The bonded structure of claim 1 wherein said composite bumps are formed on said integrated circuit element input/output pads prior to formation of said connection.

5. The bonded structure of claim 1 wherein said composite bumps are formed on said substrate input/output pads prior to formation of said connection.

6. The bonded structure of claim 1 wherein said composite bumps are formed on both said integrated circuit element input/output pads and substrate input/output pads prior to formation of said connection.

7. A method of forming a bonded structure, comprising:

providing an integrated circuit element with input/output pads;

providing a substrate with input/output pads;

providing composite bumps comprised of a polymer body and a conductive metal coating covering said polymer body formed on said integrated circuit input/output pads;

bringing together said integrated circuit element and said substrate so that said composite bumps contact said substrate input/output pads and are deformed during said contact; and

bonding said composite bumps to said substrate input/output pads.

8. A method of forming a bonded structure, comprising:

providing an integrated circuit element with input/output pads;

providing a substrate with input/output pads;

providing composite bumps comprised of a polymer body and a conductive metal coating covering said polymer body formed on said substrate input/output pads;

bringing together said integrated circuit element and said substrate so that said composite bumps contact said integrated circuit element input/output pads and are deformed during said contact; and

bonding said composite bumps to said integrated circuit element input/output pads.

9. A method of forming a bonded structure, comprising:

providing an integrated circuit element with input/output pads;

providing a substrate with input/output pads;

providing composite bumps comprised of a polymer body and a conductive metal coating covering said polymer body formed on said integrated circuit input/output pads and on said substrate input/output pads;

bringing together said integrated circuit element and said substrate so that said integrated circuit element composite bumps contact said substrate composite bumps and said integrated circuit element composite bumps and said substrate composite bumps are deformed during said contact; and

bonding said integrated circuit element composite bumps to said substrate composite bumps.

10. The method of claim 7 wherein said polymer is polyamic acid polyimide.

11. The method of claim 7 wherein said conductive metal coating is comprised of an adhesion layer, a barrier layer and a conductor layer.
12. The method of claim 7 wherein said bonding is provided by a conductive adhesive between said composite bumps and said substrate input/output pads.
13. The method of claim 8 wherein said bonding is provided by a conductive adhesive between said composite bumps and said integrated circuit input/output pads.
14. The method of claim 9 wherein said bonding is provided by a conductive adhesive between said substrate composite bumps and said integrated circuit composite bumps.
15. The method of claim 7 wherein said bonding is provided by a nonconductive adhesive between said integrated circuit element and said substrate.
16. The method of claim 7 wherein said bonding is provided by thermocompression bonding.
17. The method of claim 7 wherein said bonding is provided by application of heat energy.

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18. The method of claim 7 wherein said bonding is provided by application of light energy.

19. The method of claim 7 wherein said bonding is provided by ultrasonic bonding.

20. The method of claim 7 wherein said bonding is provided by tape automated bonding.